Newark Bay Study Area
Reconnaissance Survey Report

Baseline Human Health and
Ecological Risk Assessment

Tierra Solutions, Inc.

East Brunswick, New Jersey

April 2015

Table of Contents

Figures

Appendices

1. Introduction

This Reconnaissance Survey Report (report) has been prepared by Tierra Solutions, Inc. (Tierra) on behalf of Occidental Chemical Corporation (the successor to Diamond Shamrock Chemicals Company [formerly known as Diamond Alkali Company]) under the Newark Bay Study Area (NBSA) Administrative Order on Consent, entered pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act Index No. 02-2004-2010 (U.S. Environmental Protection Agency [USEPA] 2004). The Reconnaissance Survey was conducted under the USEPA-approved NBSA Reconnaissance Survey Work Plan (Work Plan, Tierra 2013a) (via September 5, 2013 email from Ms. Eugenia Naranjo [USEPA] to Ms. Carlie Thompson [Tierra]).

This report presents the results of the Reconnaissance Survey that was conducted in the NBSA from September 11 to September 15, 2013. The survey was performed by ARCADIS on behalf of Tierra as part of the Baseline Human Health and Ecological Risk Assessment (BHHERA) for the Remedial Investigation/Feasibility Study (RI/FS) for the NBSA. The NBSA is defined as Newark Bay and portions of the Hackensack River, Kill van Kull, and Arthur Kill (USEPA 2004; Figure 1-1).

1.1 Objectives

One of the main objectives of the Reconnaissance Survey was to provide qualitative observations of shoreline features and characteristics. As part of the survey, the shoreline was divided into segments based on land use and/or habitat type. For each segment, the presence and extent of shoreline features, vegetation, and other characteristics were documented on field data forms, and a video and still camera were used to record shoreline conditions. Observations of human access points (e.g., parks, boat launches) and human activities in the NBSA were also documented. Areas with sufficient habitat to potentially support bird nests and terrestrial mammals were surveyed on foot. Collectively, information regarding shoreline features from the Reconnaissance Survey will be used to characterize human and ecological usage in the BHHERA.

Another objective of the Reconnaissance Survey was to gather information that may be used to support future sediment and biological tissue sampling that will be conducted for the upcoming BHHERA. The existing information that was reviewed prior to conducting the survey included historic site information (Problem Formulation [Tierra 2013b] and Phase I and II Sediment Investigations [Tierra 2014]), data from past studies performed within the NBSA (USEPA's Regional Estuary Monitoring Program

[REMAP] data [USEPA 1998], U.S. Army Corps of Engineers [USACE] aquatic biological surveys [USACE 2003; 2004a,b; 2005; 2006a,b; 2007a,b,c; 2008a,b; 2009; 2013]), navigational charts, and current satellite imagery from Google Earth. The information was reviewed to identify Intertidal Areas and associated Subtidal Flats that would potentially be suitable for collecting bivalves (clams) and crabs. The Reconnaissance Survey ground-truthed these areas to identify any potential obvious physical changes that would limit the accessibility or effectiveness of performing clam and crab sampling within targeted areas. Ground-truthing did not include detailed mapping of all Intertidal Areas and Subtidal Flats, as this was beyond the effort of this survey and would require bathymetric surveys. In addition to the visual ground-truthing, reviews of literature pertaining to sampling methodologies, seasonality, regulations, and typical tissue masses of live clam and crabs were conducted.

Specific ground-truthing that was conducted as part of the Reconnaissance Survey was as follows:

- **Target Organisms**: Existing data indicate that populations of bivalves (softshell clams [*Mya arenaria*] and ribbed mussels [*Geukensia demissa*]) and crabs (blue crab [*Callinectes sapidus*]) occur within the NBSA. Field reconnaissance was conducted to determine general abundance and ability to collect target species.

- **Tissue Mass**: Tissue mass of approximately 194 grams per sample is required to analyze the full target constituent list. This sample mass would require approximately 15 to 20 clams (based on tissue estimates from Beal [2002] and minimum legal size of 1.5 inches) and 25 to 30 hard shell crabs (based on tissue estimates from Tierra [2002] and Windward [2009] and minimum legal size of 4.5 inches [carapace width]). Field reconnaissance was conducted to determine the availability of appropriately sized individuals for the proposed target species.

- **Target Areas**: Water depths and tide changes cause varying conditions within the proposed sampling areas. Also, aerial imagery indicates some potential changes to shoreline areas. Field reconnaissance was conducted to evaluate habitat, accessibility, and safety (e.g., in-water obstructions or land/water use changes) under various tidal conditions.

Results of the survey include the identification and documentation of human and ecological uses of the shoreline, identification of sampling areas for subsequent field efforts, optimization of sampling methodology, and identification of wildlife species inhabiting the NBSA, all of which will further support the BHHERA. It should be noted

that because the Reconnaissance Survey was conducted as a singular event during a brief one-week period, the absence or limited sightings of a species during the survey will not be used to exclude potential receptors from the BHHERA.

The specific tasks completed as part of the Reconnaissance Survey are as follows:

- **Task 1 – Shoreline Habitat Characterization**: This task identified the shoreline habitat types found within the NBSA (e.g., vegetation, riprap, bulkhead).

- **Task 2 – Shoreline Human Use Characterization**: This task identified human use areas (e.g., industrial/commercial, residential, recreational) along the NBSA shoreline and documented observations of human activities (e.g., port/dock work, fishing).

- **Task 3 – Identification of Sampling Areas and Evaluation of Sampling Approaches**: This task identified preliminary locations in the Intertidal Areas for subsequent sampling activities and verified that the sampling equipment proposed for the investigation is suitable to collect the desired biota and sediment samples.

- **Task 4 – Bird Nest Survey**: This task identified possible bird nesting areas.

- **Task 5 – Mammal Survey**: This task documented signs of mammal species that may utilize habitats within the NBSA.

1.2 Document Overview

This report summarizes the results of the 2013 Reconnaissance Survey in the NBSA. An overview of the general scope of reconnaissance survey activities is provided in Section 2. A description of each task (shoreline habitat characterization, shoreline human use characterization, identification of sampling areas and evaluation of sampling approaches, and bird nest and mammal surveys) and a summary of the results are presented in Sections 3 through 6, respectively. References are provided in Section 7.

The text is supported by relevant tables and figures, as well as the following appendices:

- Appendix A – Field Data Forms
- Appendix B – Photo Log
- Appendix C – Shoreline Characterization Video (on DVD)

6. Bird Nest and Mammal Surveys

This section describes the methodology and results of the bird nest and mammal surveys.

6.1 Methodology

Bird nest and mammal survey areas were identified based on the habitat characterization and segments identified as "habitat" during the video survey on September 11, 2013. Where feasible, the boat was brought to shore in these habitat areas and field staff surveyed the shoreline on foot looking for remnants of bird nests and signs of mammals (e.g., scat, tracks). Areas for bird and mammal surveys included the southern portion of the NBSA, such as on Shooters Island (Segment 32), in Segment 1, and in the Arthur Kill Wetlands Complex near the Goethals Bridge (Segment 33). Additional areas for surveying included Kearny Point (Segment 20), the large intertidal area in Segment 22, and along various sandy shoreline areas.

6.2 Results

Results of the bird nest and mammal surveys are provided in Tables 6-1 and 6-2, respectively. Locations of observations are shown on Figure 3-2, and direct and indirect wildlife observations are provided in Table 3-3. Associated photographs are provided in the photo log in Appendix B (B-22 through B-24).

No bird nests were observed along any portions of the shoreline; rather, they were observed located on structures in the water (e.g., mile markers, abandoned/dilapidated wooden and metal pier structures; Table 6-1, Appendix B-22). Both large and small nests were observed. The large nests consisting of hard sticks are likely to be osprey (*Pandion haliaetus*) nests. The smaller nests consisting of softer grasses and seaweed that are also located on structures in the NBSA are likely to be double-crested cormorant (*Phalacrocorax auritus*) nests.

Direct mammal sightings were documented, as well as any signs of mammals present along the shoreline (e.g., tracks, scat). Results are provided in Table 6-2 and in associated photographs in Appendix B (B-23 and B-24). The majority of mammals are human-tolerant species that are frequently found in urban areas, including Norway rat (*Rattus norvegicus*), skunk (e.g., *Mephitis mephitis*), coyote (*Canis latrans*), deer (e.g., *Odocoileus virginianus*), rabbit (e.g., *Sylvilagus* spp.), and cat (*Felis catus*). A muskrat (*Ondatra zibethicus*) was seen swimming in the large intertidal area in Segment 22.

Table 3-3
Wildlife Species Observed

Common Name	Scientific Name
Birds	
American crow	*Corvus brachyrhynchos*
Belted kingfisher	*Megaceryle alcyon*
Black duck	*Anas rubripes*
Blue-winged teal	*Anas discors*
Brant	*Branta bernicla*
Canada goose	*Branta canadensis*
Catbird	*Dumetella carolinensis*
Common sandpiper	*Actitis hypoleucos*
Common tern	*Sterna hirundo*
Double-crested cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodias*
Herring gull	*Larus argentatus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Laughing gull	*Leucophaeus atricilla*
Little green heron	*Butorides virescens*
Mallard	*Anas platyrhynchos*
Mockingbird	*Mimus polyglottos*
Mourning dove	*Zenaida macroura*
Osprey	*Pandion haliaetus*
Pied-billed grebe	*Podilymbus podiceps*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
White egret	*Ardea alba*
Mammals	
Cottontail rabbit	*Lepus sylvaticus*
Domestic cat	*Felis catus*
Domestic dog	*Canis lupus familiaris*
Eastern coyote	*Canis latrans*
Muskrat	*Ondatra zibethicus*
Norway rat	*Rattus norvegicus*
Raccoon	*Procyon lotus*
Striped skunk	*Mephitis mephitis*
White-tailed deer	*Odocoileus virginianus*
Reptiles	
Diamondback terrapin	*Malaclemys terrapin*

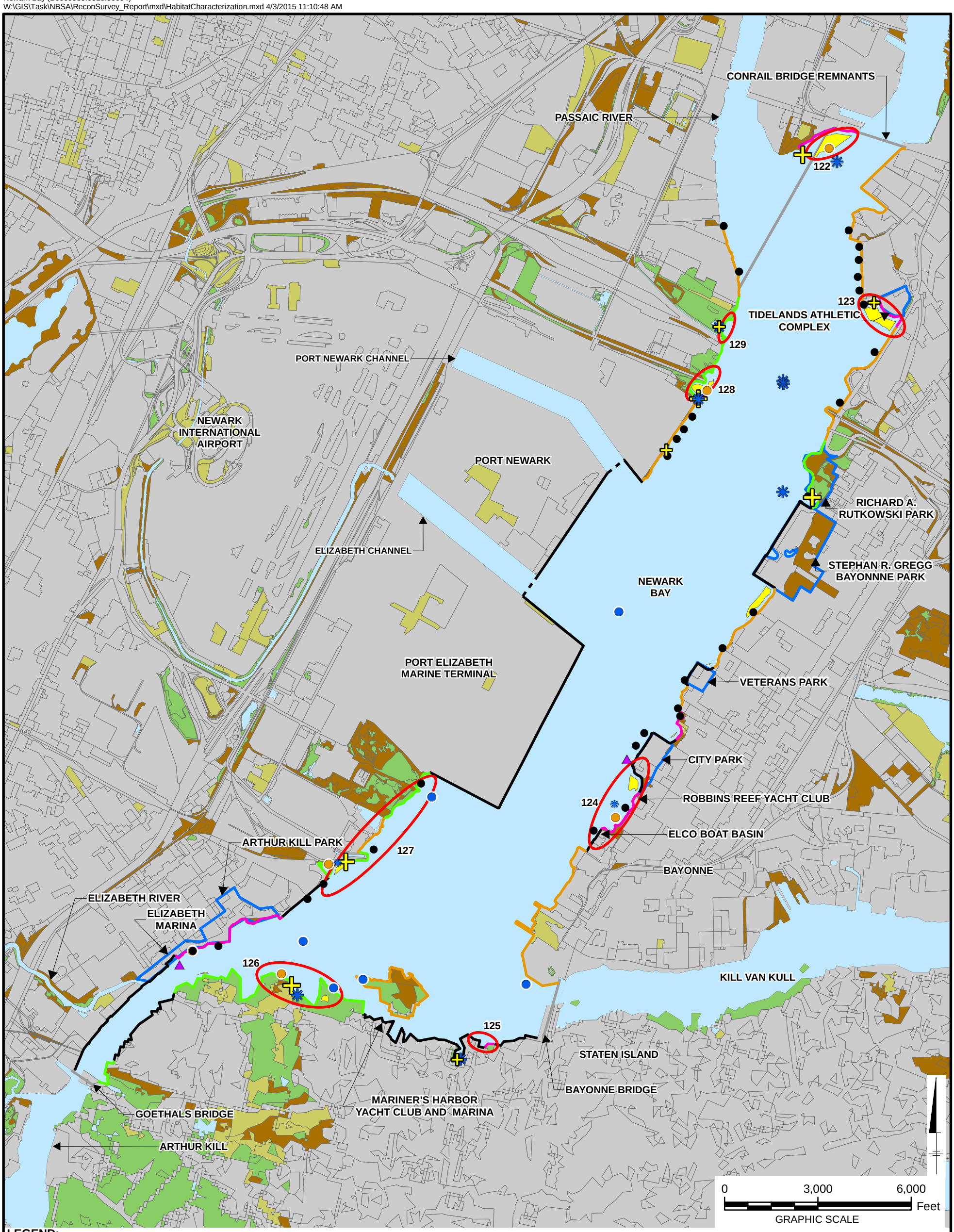
Notes:
Wildlife noted were direct (i.e., visual, audible) observations, as well as observations of scat and/or tracks.

Table 6-1
Bird Nest Observations

Shoreline Segment[1]	Possible Species	Description	Appendix	Coordinates (DD.MM.SSSS)[2]	
				Longitude	Latitude
1	Osprey	Single nest on old rusty boiler	B-22	40.38.6217	74.10.0793
4	Cormorant	~ 8 nests on mile marker in channel near Bayonne Bridge		40.38.6363*	74.08.7421*
24	Cormorant	~ 9 nests on mile marker #15		40.40.6110	74.08.0855
25	Osprey	Single nest on piling		40.39.6314	74.09.3917
29/30	Gull/cormorant	~ 8 nests on mile marker #22		40.38.8688	74.10.2905
32	Osprey/cormorant	~15 nests on abandoned wooden structures		40.38.6657	74.09.8760

Notes:
1. Shoreline segments are shown on Figure 3-1.
2. Bird nest observation locations are shown on Figure 3-2.
*Coordinates are estimates.

CITY: SYR DIV/GROUP: IT DB: KES LD: PIC: PM: TM: TR:
Newark Bay (B0009989.0016.00004)
W:\GIS\Task\NBSA\ReconSurvey_Report\mxd\HabitatCharacterization.mxd 4/3/2015 11:10:48 AM



LEGEND:

- CLAM STATION (< 4 SAMPLES)
- CLAM STATION (> 4 SAMPLES)
- CRAB STATION (< 4 SAMPLES)
- CRAB STATION (> 4 SAMPLES)
- TARGETED CRAB AND CLAM SAMPLING AREA
- BIRD NEST LOCATION
- MAMMAL OBSERVATION
- DISCHARGE PIPE OBSERVATION
- BOAT RAMP
- NEWARK BAY STUDY AREA BOUNDARY
- INTERTIDAL AREA
- PARKS AND RECREATIONAL AREAS

OBSERVED SHORELINE HABITAT:

- BULKHEAD
- MIXED INTERTIDAL
- RIPRAP
- VEGETATION

LANDCOVER:

- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

NOTES:

1. 2007 NEW JERSEY LAND USE DATA DOWNLOADED FROM THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION GEOGRAPHIC INFORMATION SYSTEM WEBSITE AT www.state.nj.us/dep/gis.
2. 2006 NEW YORK NATIONAL LAND COVER DATA DOWNLOADED FROM THE NEW YORK STATE GEOGRAPHIC INFORMATION SYSTEMS CLEARINGHOUSE AT www.nysgis.state.ny.us.
3. THE INTERTIDAL AREAS SHOWN ARE CONSISTENT WITH THOSE PRESENTED IN THE PROBLEM FORMULATION (TIERRA 2013) AND WERE VERIFIED DURING THE RECONNAISSANCE SURVEY.
4. THE NEWARK BAY STUDY AREA BOUNDARY WAS USEPA-APPROVED AND UTILIZED IN THE PHASE I AND II SEDIMENT INVESTIGATIONS, BUT MAY BE CHANGED BY USEPA FOR FUTURE INVESTIGATIONS UNDER THE RI/FS.
5. BIRD NEST OBSERVATIONS ARE DESCRIBED IN TABLE 6-1.
6. MAMMAL OBSERVATIONS ARE DESCRIBED IN TABLE 6-2.

NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

RECONNAISSANCE SURVEY REPORT

SHORELINE HABITAT CHARACTERIZATION AND SAMPLING STATIONS

APRIL 2015

FIGURE 3-2

Mariners Marina

Mile Marker 15

Mile Marker 22

Segment 25

Shooters Island

TIERRA SOLUTIONS, INC.
NEWARK BAY STUDY AREA REMEDIAL INVESTIGATION

RECONNAISSANCE SURVEY REPORT

BIRD NEST SURVEY: BIRD NEST OBSERVATIONS

APRIL 2015

FIGURE
B–22

Recon_Survey_Segments_20131230.m